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10/710,152

06/22/2004

John G. Macke JR.

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08/28/2009

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EXAMINER

EWALD, MARIA VERONICA

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

08/28/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|--|-------------------------------------|--|
| Office Action Summary | Application No. 10/710,152 | Applicant(s) MACKE ET AL. | |
| | Examiner MARIA VERONICA D. EWALD | Art Unit 1791 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-10, 18-22 and 41 is/are pending in the application.
- 4a) Of the above claim(s) 18-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-10 and 41 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

13. Claim 41 is objected to because of the following informalities: as written, claim 41 (line 14) identifies "a receiving area" however, it appears that the receiving area should be further clarified by the phrase "**a tool section** receiving area" such that it is clear that the receiving area is on or associated with the tool section. Other dependent claims which identify a receiving area further limit the term with the phrase "tool section" (see claims 2 and 3).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 – 6, 9 – 10 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. (U.S. 5,637,175). Feygin, et al. a sintering system comprising: a tool chamber enclosing a sinter material comprising a laser-fusible sinter powder (figure 2; column 16, lines 20 – 30); a laser system sintering said sinter material as a function of controller signals (column 5, lines 39 – 50; column 16, lines 33 – 40); a first tool section having a first plurality of predetermined features (column 7, lines 60 – 67; column 13, lines 5 – 15); and at least one other section of said tool having a plurality

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of predetermined features (column 13, lines 1 – 25). Furthermore, the tool sections are joined or fitted together in a predetermined manner to form a larger tool (column 13, lines 25 – 60).

Feygin, et al. teach a rapid prototyping apparatus or a layered object manufacturing (LOM) system, wherein a laser-sinterable material (whether a powder or a sheet material) is contoured and subsequently or simultaneously bonded to previously-fabricated layers. The apparatus includes a build chamber with a reciprocating platform, a laser system and a supply of material. The object design may include such complex contours such as intricate channels, voids or surface irregularities, which are created in CAD (column 7, lines 60 – 67). The object design is first created by the designer using a preferred computer design program. The program then “slices” the object into discrete cross-sections. The cross-sections are then fed to a controller and accordingly, the powder or sheet material deposited onto the build platform is contoured per the cross-sectional shape (column 5, lines 25 – 35 and 40 – 50). The powder deposited onto the build platform may be sintered per the designated cross section wherein the bond between the sintered sections remains weak with the already formed layers or tool section (column 12, lines 40 – 65). *Subsequent to sintering, the layers may be fully compressed and joined such that the object is subjected to impact or vibration (column 13, lines 5 – 20). Thus, the layers are each “tool sections” which are subsequently compressed and joined via the desired compaction or vibration.* Alternatively, if a sheet material is utilized instead of the bulk powder, the fabrication steps remain similar in that the individual cross-sections are

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separately sliced or contoured. However, the entire stack of laminations or tool sections may be joined or laminated after the laminations have been produced (column 17, lines 1 – 40).

Feygin, et al., however does not specifically teach that the tool sections comprise a joint component being adapted to couple to another section of the tool. This, however, is an obvious modification and depends on the designer's object or tool design. Feygin, et al. is already teaching that the object may include contours, intricate details, surface voids and/or channels. Thus, including a joint component whether a tongue, bolt, section holes, or slots is well within the level of one of ordinary skill in the art. The Examiner is also noting that the object design as claimed in new claim 41 limits the object itself which can easily be modified accordingly depending on the type of object being produced wherein the design does not further limit the components of the system already claimed.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the system of Feygin, et al. such that the tool section(s) include a joint component adapted to couple to at least one other section of said tool, wherein the joint component is a bolt, section hole or tongue depending on the object design being created by the user.

Claims 7 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. in view of Masters (U.S. 5,216,616). Feygin, et al. teach the characteristics

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previously described but do not teach that the tool is comprised of a heat sink positioned within said tool chamber or a buffer feature protecting said joint component.

In a rapid prototyping apparatus, Masters teaches the presence of a heat sink or buffer feature in the form of supports which are formed within the build chamber to prevent shrinkage or warpage during curing (column 2, lines 22 – 27; column 6, lines 8 – 35). The supports are easily melted away after the object has been formed (column 6, lines 26 – 30).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Feygin, et al. further configured with the supports of Masters for the purpose of reducing shrinkage or warpage during curing of the three-dimensional object.

Response to Arguments

15. Applicant's arguments filed June 5, 2009 have been fully considered but they are not persuasive. Applicant argues that the reference of Feygin, et al. has been interpreted incorrectly by the Examiner. Applicant further cites passages from the reference of Feygin, et al. to support such a conclusion. For example, Applicant points to column 16, lines 33 – 40 and column 17, lines 60 – 67 and argues that each of these passages teach apparatus for forming laminations (designed via a CAD system) from sheet materials but neither passage teaches the use of a laser sintering system sintering material as a function of controller signals. The Examiner agrees that the cited passages deal with sheet materials; however, *in further and additional embodiments*

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cited by the Examiner in this and the previous rejection, Feygin, et al. do teach a laser sintering system as claimed. Column 12, lines 40 – 67 clearly teaches a powder-based LOM system (as shown in Figure 1), wherein powder is spread onto a build platform (column 12, lines 43 – 45) and compressed by the flat surface of a roller. Subsequently, geometrical information about the first slice of the object is transmitted from the computer to the scanning component of the system which functions like an automated laser printer. The printer scans the surface of the powder with a “focused laser beam” in the pattern of the desired cross-sectional slice (column 12, lines 55 – 60). Edge bevels (which act as joint components) are formed on the slices which are fused, laminated or bonded together. Feygin, et al. even state that “the platform and the environment thereabout is controlled at an elevated temperature just below the *fusion, sintering or welding or softening temperature of the powder to reduce any internal stresses in the object*” (column 13, lines 1 – 5). The powder cross-sections which correspond to “tool sections” as claimed are weakly bonded and in a fragile green state (i.e., the cross-sections have not been fully bonded to correspond to the *larger tool design*) and may be compressed in a later step (column 13, lines 55 – 60). Thus, the apparatus of Feygin, et al. is fully capable of generating separate tool sections from a CAD program, physically creating such sections and subsequently bonding the sections to form a larger tool or object.

Though Applicant argues that the apparatus of Feygin, et al. does not anticipate or render obvious Applicant’s claimed invention, the Examiner disagrees and cites the pertinent passages from Feygin, et al. which clearly discuss the use of powder or laser-

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fusible powder materials to create an object. The Examiner agrees (and clearly states in the rejection(s)) that Feygin, et al. do not teach the tool design as claimed. *However, the Examiner contends that the tool design does not materially limit the apparatus or impart any unique features to the apparatus. The tool design is governed by the user and the object desired to be created.*

Furthermore, though Applicant argues that Feygin, et al. do not teach the creation of a tool which is too large to be fabricated in a single step in a conventional SLS system, which is thereby grown in multiple pieces and subsequently joined together, such an argument and the feature itself does not further distinguish the apparatus already known in the art. Applicant is merely using a known and conventional SLS system to fabricate individual pieces which are subsequently joined together via a tongue-groove fitting, bolt or cross-pin components.

With respect to dependent claims 7 – 8, Applicant argues that Masters teaches the use of ballistic particles or Litetak for the strands, but fails to teach laser sintering and further argues that the features as taught by Masters is not applicable to Feygin, et al. The Examiner disagrees. Masters teaches the use of support materials which operate as a buffer or heat sink (the support material absorbs any heat and thereby cools the component) to limit warpage of the fabricated object during sintering or manufacture. Thus, the Examiner maintains the rejections of dependent claims 7 – 8.

References of Interest

16. Mattes (U.S. 2006/0108712 A1) is cited of interest to show the state of the art. Mattes teaches a rapid prototyping system, wherein multiple parts may be fabricated currently in a multi-sectioned build chamber.

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA VERONICA D. EWALD whose telephone number is (571)272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MVE

/Maria Veronica D Ewald/
Primary Examiner, Art Unit 1791